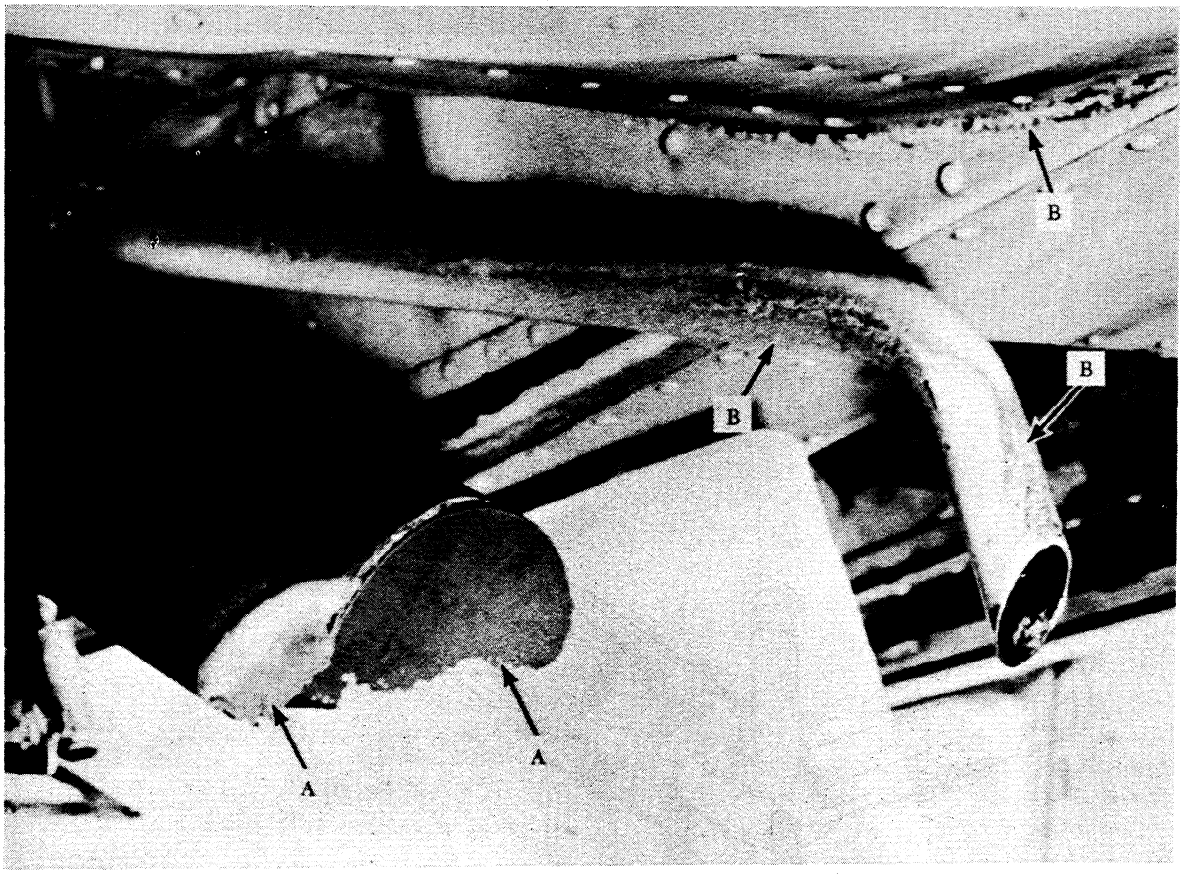
Be certain that the magneto holddown nuts are tight and properly safetied. If the holddown nuts are loose, it will be necessary to check the magneto timing to make sure it has not been disturbed and technical assistance should be sought. Inspect magneto and cover screws for security.

Check magneto ground wires for condition and proper attachment to the magneto terminal and the ignition switch. If the magneto is not properly grounded, it is possible for the engine to operate, even though the magneto switch is in the "OFF" position. A check of this "OFF" position should be made a regular part of each engine shut down after each flight. BEWARE OF THE PROPELLER, even when the switch is "OFF"—especially when the engine is warm.

Inspect each exhaust stack for condition and security of attachment. Examine the entire collector ring or manifold for cracks, failure of the joints, or other indications of deterioration. Check that no portion of the engine cowling has been in contact with the collector ring or stacks. Be certain that all support bolts are tight and safetied.

Inspection of the engine exhaust system should be thorough to ensure there are no defects that might permit an open flame to enter the engine compartment and present a fire hazard. Exhaust leakage can be identified by flame or smoke "tracks" (gray-white de-



A. Tailpipe burned.
B. Exhaust deposits.

FIGURE 3-16. Exhaust stack damage.

posits) at a break in the system or on the adjacent area where exhaust gases impinge.

Figures 3–16 shows an example of exhaust outlet damage "A" and evidence of exhaust deposits "B."

On turbine engines, check the tailpipes and trim devices to see that they are not cracked and are in order. Check the controls for freedom and alignment. Any binding or malfunctioning of an engine control system should be traced to its source and corrected.

Figures 3–17 shows a heat exchange shroud opened for inspection. Arrows indicate areas which are prone to failure.

Remove the heater shroud from the exhaust manifold or muffler and inspect for cracks, burned-out spots, or defective welds. Determine that shutoff valves are operating through their full travel. Ensure cold air and heater ducts are free from obstructions and cracks, and are properly secured. If the heater incorporates an intensifier tube inside the exhaust ring or manifold, it should be removed and inspected for cracks or burned-out spots. Defects noted in the heater system must be repaired or the unit replaced immediately to assure that carbon monoxide or flames will not enter the cabin or cockpit. When an exhaust

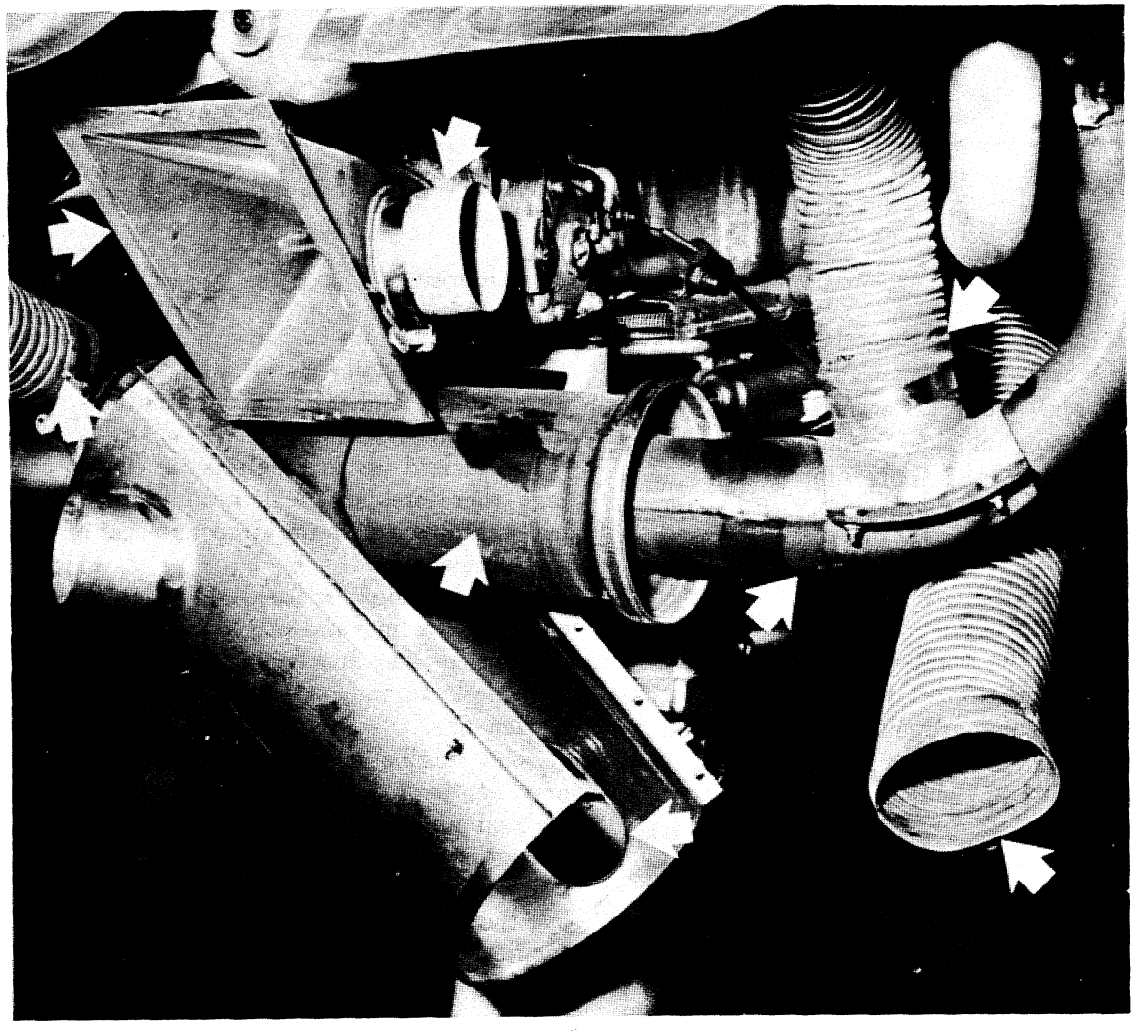


FIGURE 3-17. Heat exchanger—shroud removed.

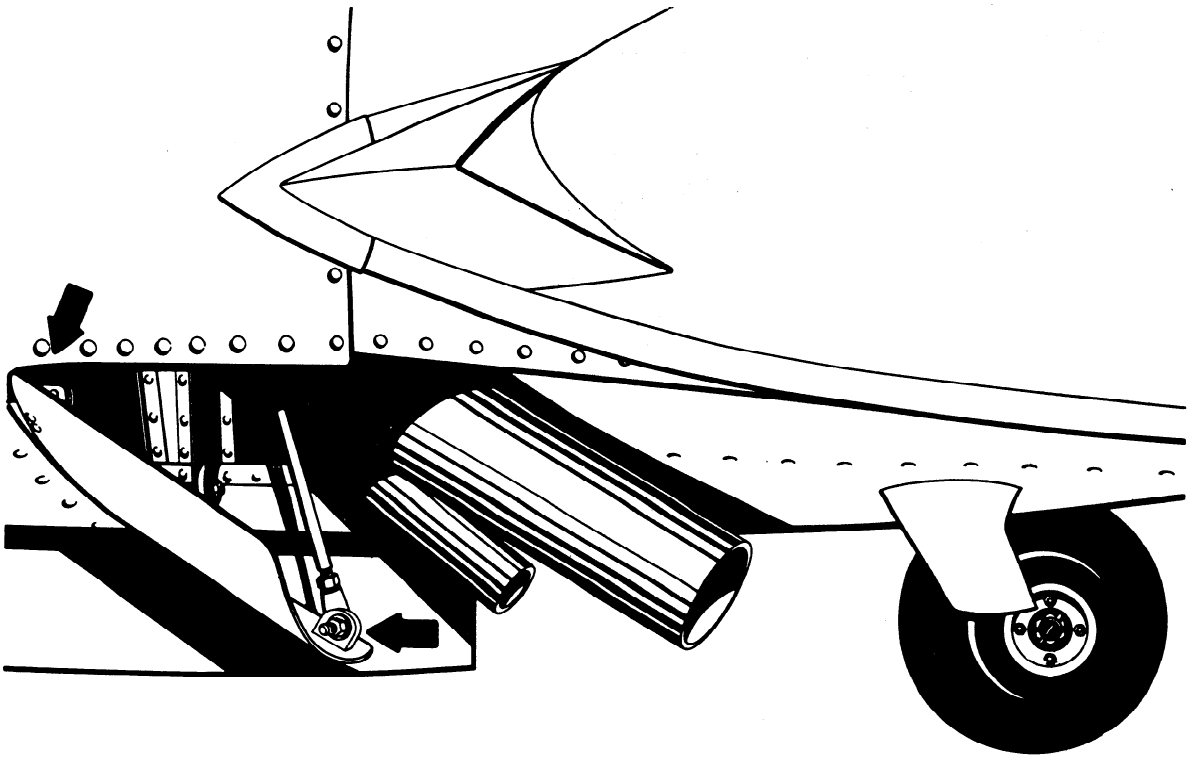


FIGURE 3-18. Cowl flap checkpoints.

leak is indicated or suspected during flight, open the cabin windows. Turn the cabin heat "OFF" and fresh air ventilation "ON" to avoid carbon monoxide poisoning. Do not use these procedures to initiate a flight with known exhaust system or heater defects. *Carbon monoxide kills.*

Operation of the cowl flaps is of vital importance in keeping cylinder head temperatures within the required operating range.

Determine that cowl flaps are in good condition; the hinges are not worn beyond limits; and the actuation mechanism is properly rigged for full travel and is operating properly. Cowl flaps must be maintained in good operating condition at all times in order to obtain required engine efficiency.

Figures 3–19 shows example of two types of repairs to engine baffles. "A" is a sheet metal reinforcement for a broken holddown bolt hole. "B" is a welded repair in a similar area.

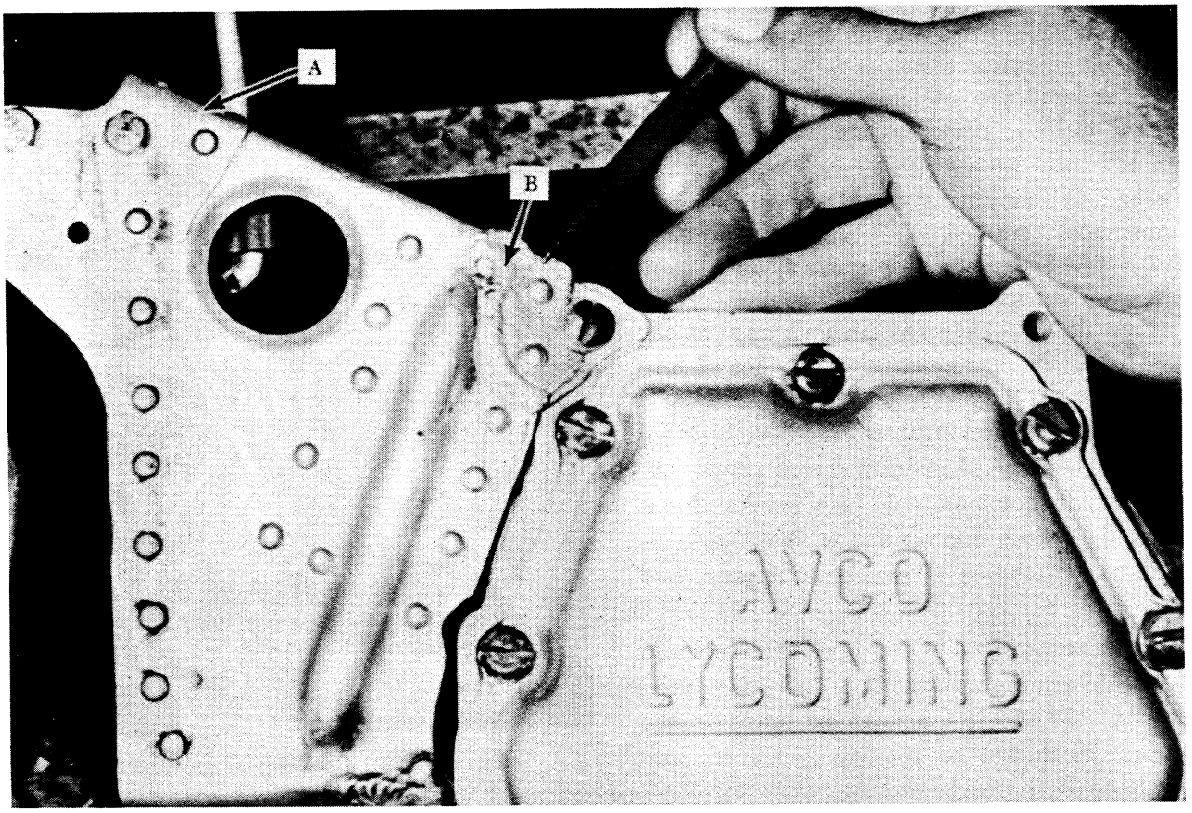
Check baffles for security, holes, cracks, and proper fit around the cylinders. Inspect all air entrances and exits for deformations which might obstruct airflow.

Pressurized air is required for engine cooling; therefore, any leak around or through baffles causes a pressure drop and loss of cooling efficiency.

Use a drop light or flashlight to look through the nose cowling and check for gaps between the top cowling and engine baffles.

Inspect engine cylinders for cracked or broken fins.

Some engine mounts are heat-treated and may not be repaired by welding unless normalized and reheat-treated to their previous strength values. When cracks or inferior welds are found in such units, replacement or repair by the manufacturer or authorized repair facility is necessary. Nonheat-treated engine mounts may be repaired by welding if the work is performed in accordance with the manufacturer's instructions and is done by a person authorized in FAR 43.



A. Sheet metal reinforcement.
B. Welded.

FIGURE 3-19. Engine baffles.

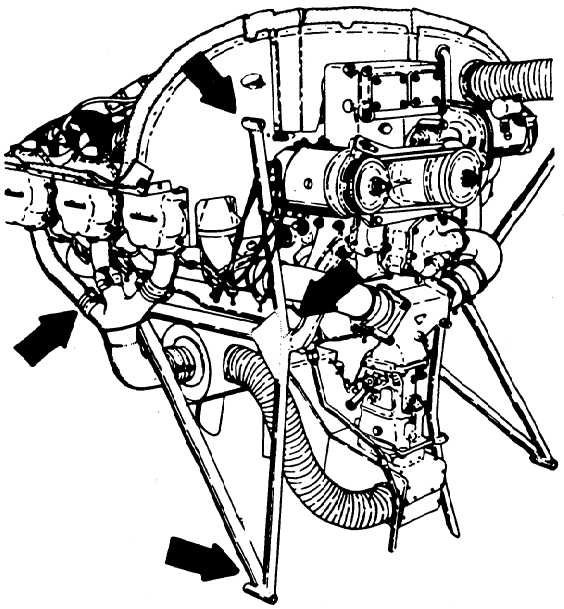


FIGURE 3-20. Engine mount checkpoints.

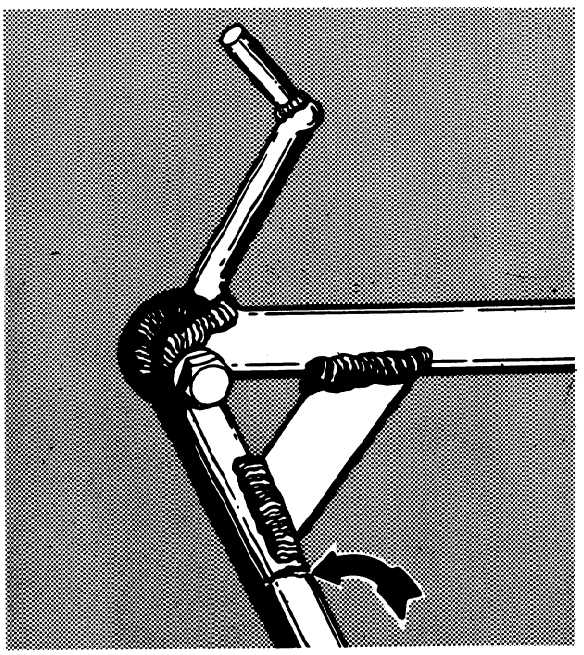


FIGURE 3-21. Cracked engine mount.

Examine the entire engine mount structure with a magnifying glass, especially at welds. Look for evidence of cracks or failure and inferior welds. Ensure that all attachment bolts are tight and properly safetied.

Inspect the mounting of all accessories such as generator, starter, oil pump, oil pressure relief valve body, etc., for security of attachment, oil leakage, and proper safetying. If oil or other fluid is detected around any of the accessories, the unit should be removed and the leakage corrected.

When combustion heaters are installed, inspect for security of mounting and proper installation of hot and cold air intake ducts. Inspect fuel lines for condition, leaks, attachment, and freedom from obstructions and kinks.

With heater switch "ON," check the solenoid valve to determine whether it is operating satisfactorily. If no clicking can be heard in the solenoid, it should be removed, cleaned, and

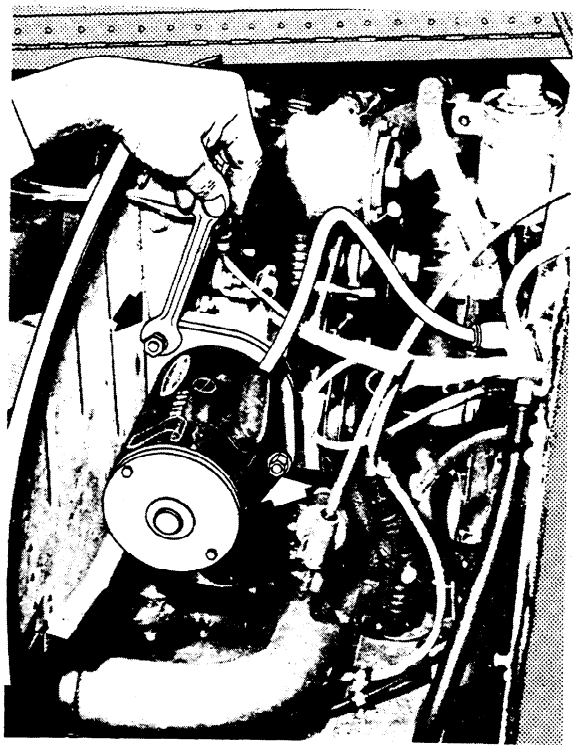


FIGURE 3-22. Checking starter security.

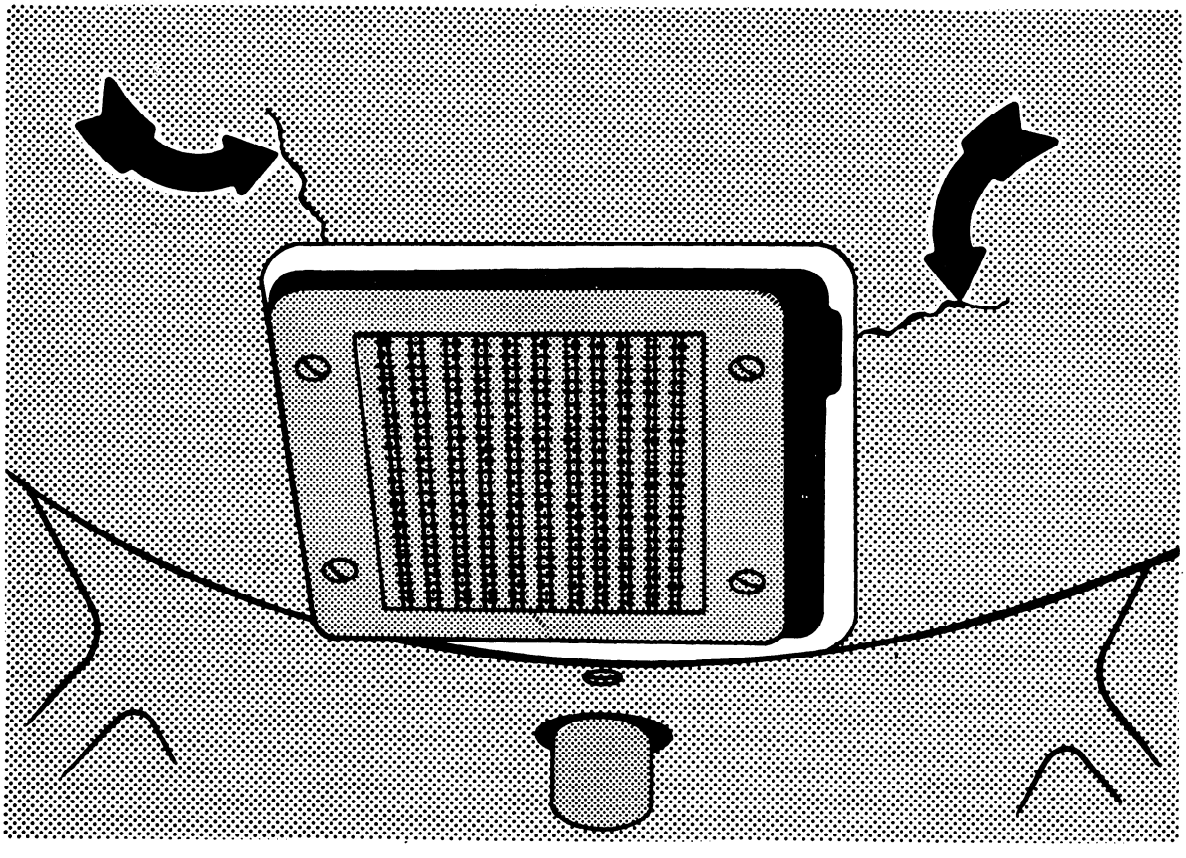


FIGURE 3-24. Damaged cowling.

inspected. Ensure that exhaust and overflow lines are properly routed through the structure to the outside air.

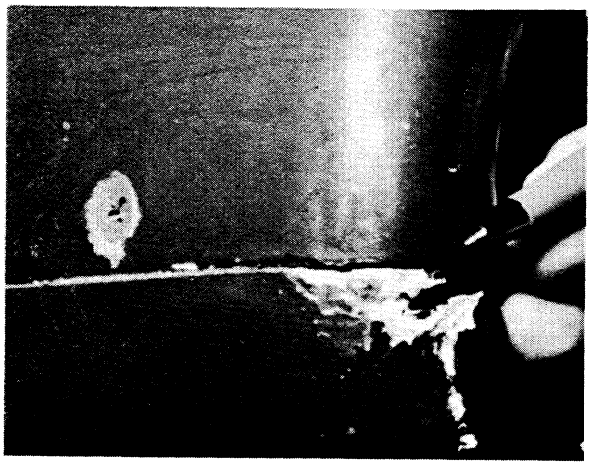


FIGURE 3-23. Inspect cowling for damage.

Inspect engine cowling for defects such as cracks, dents, chafing on portions of the engine or aircraft structure, and loose rivets, clamps, fasteners, or other locking devices.

After completion of cowling repairs, reinstall and check for proper fit and security.

The presence of black or dark streaks on aluminum structure usually indicates chafing caused by vibration and looseness.

Check condition of the firewall behind the engine. Inspect insulation for condition, attachment, and for oil or fuel saturation.

Oil or fuel saturation of insulation material presents a serious fire hazard. The source of the oil or fuel must be located and the leak corrected. The saturated insulation should be removed and cleaned if possible. If cleaning is impossible, the insulation must be replaced.

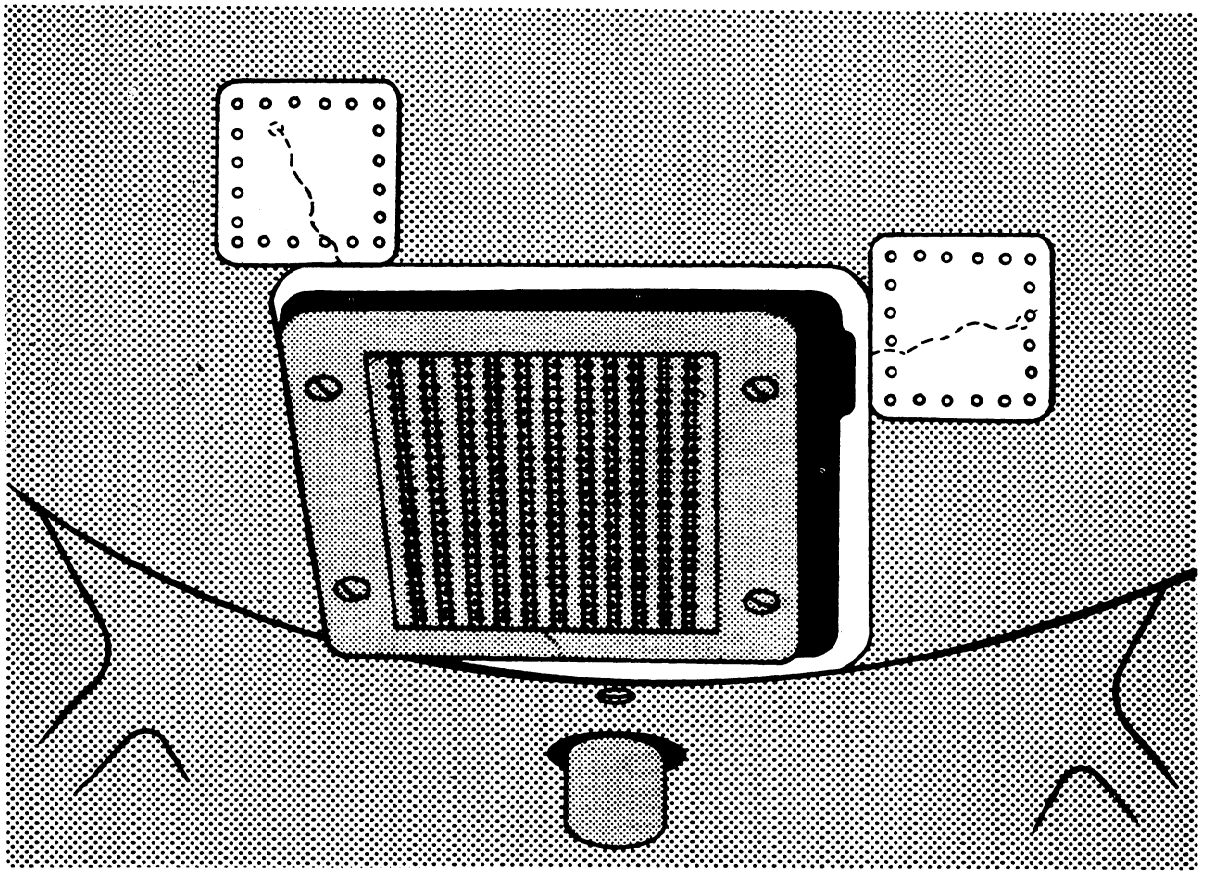


FIGURE 3-25. Repaired cowling.

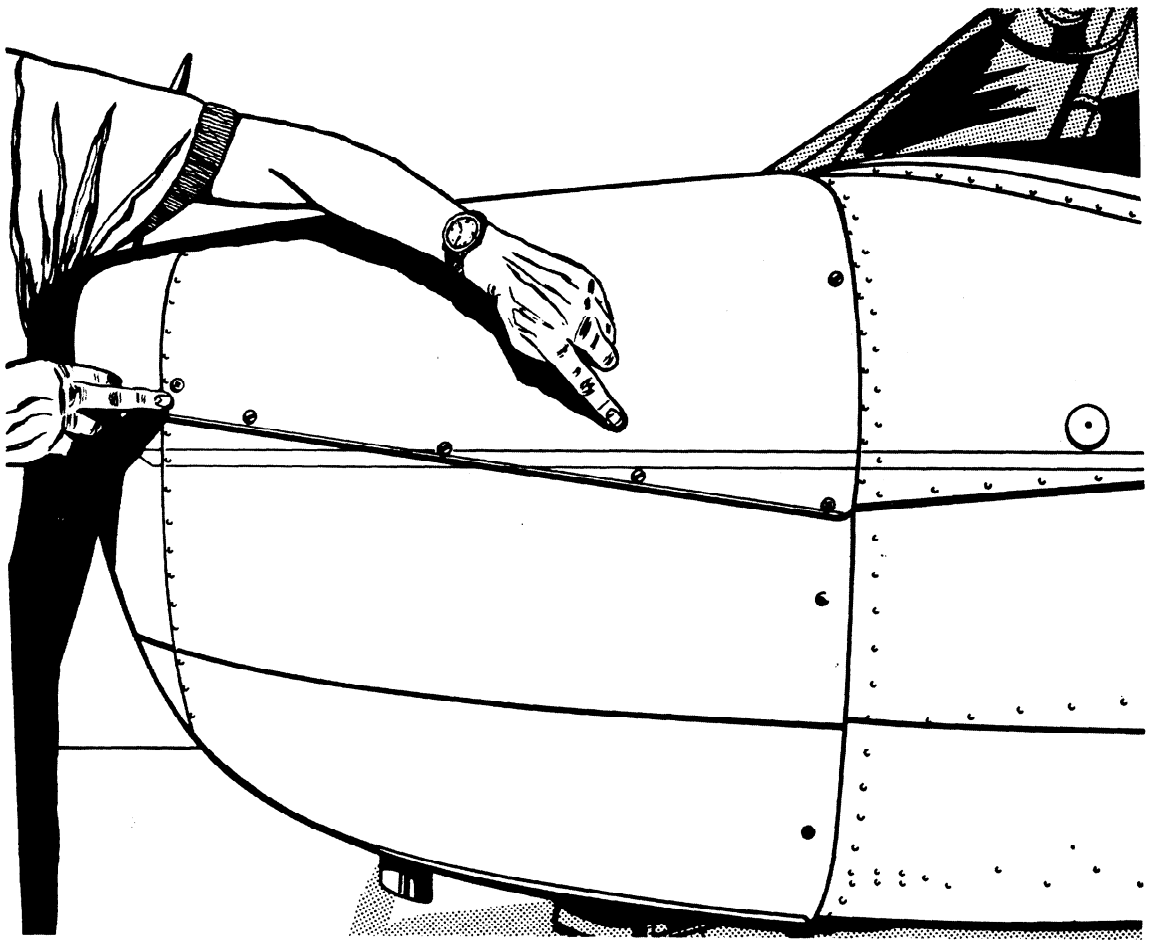


FIGURE 3-26. Cowling installation checkpoints.

Figure 3–27 shows the results of improper fit of the engine access cowling. Note arrow pointing to hole worn in nacelle fairing.

Battery Maintenance Precautions

It is a good practice to protect the area adjacent to the battery with an acid-proof paint if it is a lead-acid battery, or an alkaline base paint if it is a nickel-cadmium battery.

When working around the battery, care should be exercised to avoid short-circuiting across the terminals. Resultant arcing presents a serious fire hazard. As a safety precaution, the battery should be removed during cleaning and repair operations. Remove the "ground" terminal first, and reinstall it last.

Lead-Acid Battery Inspection and Service

Check the battery box and terminals for corrosion and security. Inspect vents and overflow lines for condition and obstructions. These lines should be routed to prevent overflowing liquid from contaminating and corroding the adjacent structure.

Check the charge of a lead-acid battery by using a hydrometer. When the hydrometer test indicates a variance of more than 20 points between cells, the battery should be recharged or replaced.

If the electrolyte in a lead-acid battery is low, replenish it with distilled water to the specified level. A 30-minute flight should be sufficient operating time before conducting a hydrometer test after refilling.

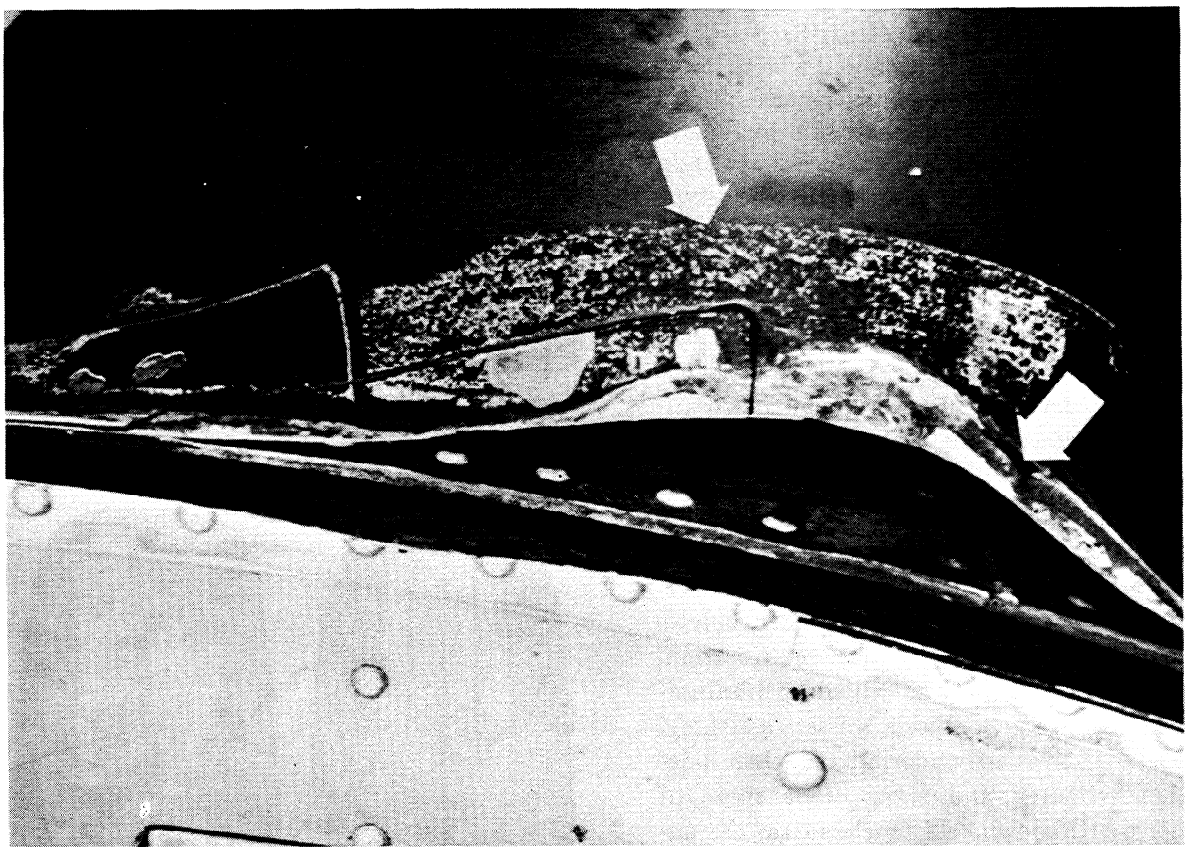


FIGURE 3-27. Evidence of chafing.

Nickel-Cadmium Battery Inspection and Service

Check the battery box and terminals for corrosion and security. Inspect vents and overflow lines for condition and obstructions. These lines should be routed to prevent overflowing liquid from contacting and corroding the adjacent structure.

Check the individual cell voltages. If an unbalanced condition exists, maintenance by a certificated mechanic or certificated repair station is required.

White powder on top of the battery indicates spillage of the electrolyte and requires the same action as the unbalanced condition.

Maintenance should be done in accordance with the manufacturer's specifications.

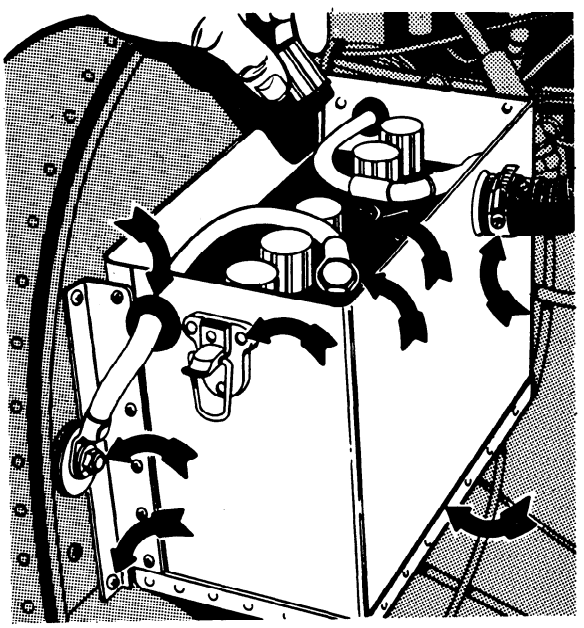


FIGURE 3-28. Battery installation checkpoints.